Ivan Cisneros

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Robotics — *Aug 2022*
Thesis: "A VPR-Based Technique for UAV Localization In Unvisited Environments"
Relevant Coursework: Computer Vision, Math Fundamentals for Robotics, Machine Learning, Planning and Decision-Making in Robotics, Deep Learning for Computer Vision, Simultaneous Localization And Mapping

Harvard University — Cambridge, MA
Bachelor of Science in Electrical Engineering with a minor in Computer Science — *Dec 2016*
Thesis: "A Sensor System for Autonomous Unmanned Aerial Vehicle Landing"
Relevant Coursework: Autonomous Robot Systems, Artificial Intelligence, Convolutional Neural Networks for Visual Recognition

SKILLS

Technology: Computer Vision; Machine Learning; PyTorch; Robot Operating System (ROS); OpenCV; Linux; Git; Docker
Programming: Python; C++; Matlab; LaTeX; BASH
Other Skills: Artificial Intelligence; Localization; Project Management; Data Analysis; Simulation and Modeling; Unreal Engine 4; Microsoft AirSim; TensorRT; QGIS; Remote Sensing Data; Synthetic Data Generation; Field Testing; Drone Piloting

EXPERIENCE

Carnegie Mellon University – Robotics Institute — Pittsburgh, PA
Robotics Research Assistant, Airlab — *Oct 2020 – Present*

- Led research and implementation of perception-focused GNSS-denied localization for Unmanned Aerial Vehicles (UAVs) using a downward-facing camera. Our pipeline (written in C++ and Python) is robust to stark visual changes in environments, greatly improving localization accuracy and reliability, ultimately achieving wide generalizability. *(paper in development)*
- Optimized hardware and software components for efficient real-time edge operation on our custom Nvidia Jetson sensor payload. Collaborated with a multidisciplinary team to integrate autonomy algorithms into a real-world UAV system.
- Spearheaded research in deep learning-based perception method for omnidirectional camera-based localization for Unmanned Aerial Vehicles in 3D using domain adaptation and simulator training. *(iSimLoc paper)*

NASA – Jet Propulsion Laboratory — Pasadena, CA
Electrical Engineer / Technical Project Manager — *Feb 2017 – Jan 2020*

- Redesigned, tested, and integrated the electronics system for the Spacecraft Atmosphere Monitor mass spectrometer, now operating on the International Space Station. Development included writing software interfaces and test benches in Python.
- Formulated and built electronics for the SiCMag space-grade magnetometer. As the lead electrical engineer, I was responsible for developing design requirements to fulfill scientific needs, writing software interfaces in Python, designing sense/control and power PCBs, LTspice circuit simulations, PCB layouts, and documentation for assembly and testing.
- Managed a 20-person team on a $10 million subcontract for the Photon Counting Camera detector subsystem for the Deep Space Optical Communications instrument, part of the Psyche mission.

Tesla — Palo Alto, CA
Hardware Engineering Intern — *Sept 2015 – Sept 2016*

- Designed and implemented electronic modules for Tesla Model S Battery Management System automated testing, streamlining assembly line processes and modular in-circuit testing. Wrote all of the interface and controller firmware in C++.
- Conducted board-level analysis on various electronic subsystems, including certain Autopilot v2 modules, contributing to the improvement of hardware performance and reliability across multiple components.

PUBLICATIONS

ALITA: A Large-Scale Place Recognition Dataset for Long-term Autonomy — *Under Review, 2023*
ALTO: A Large-Scale Dataset for UAV Visual Place Recognition and Localization — *Under Review, 2023*
AutoMerge: A Framework for Map Assembling and Smoothing in City-scale Environments — *IEEE T-RO, 2023*
iSimLoc: Visual Global Localization for Previously Unseen Environments with Simulated Images — *IEEE T-RO / IROS, 2023*
The Technology Demonstration of the Spacecraft Atmosphere Monitor — *ICES, 2019*

ACADEMIC PROJECTS

A Multi–Model Driver Monitoring System — *Carnegie Mellon University | Dec, 2021*

- A deep learning based driver monitoring system that uses a 2-way dash camera to capture in-cabin driver behaviors and roadside objects/context, as well as ego vehicle speed to evaluate the automotive driving safety level.

Rough Terrain Navigation with Wheeled Robot — *Carnegie Mellon University | Dec, 2021*

- Global path planning with A* (A-star) using recombinant Dubins path primitives for expanding new states. We utilize a Model Predictive Controller to optimize controls to follow this trajectory over simulated rough terrain using a 4-wheeled ATV.

Implementation of Visual-Lidar Odometry and Mapping (V–LOAM) — *Carnegie Mellon University | May, 2021*

- Implemented the visual odometry module of V-LOAM and compared our accuracy with the official implementation on the KITTI odometry benchmark.